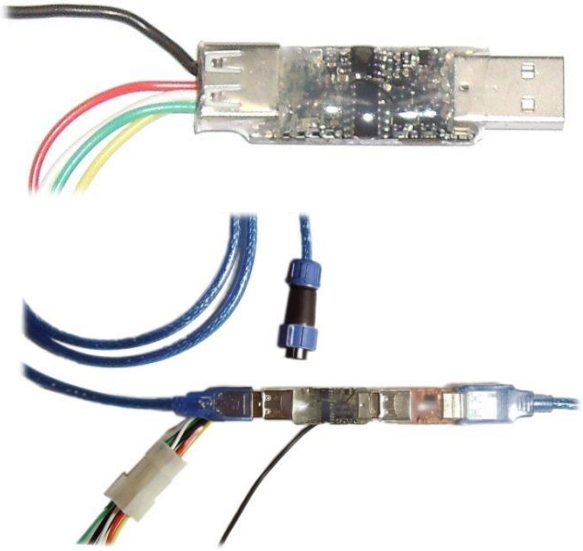
SiCan – Simple CAN Charger Interface

- **Drives CAN-enabled programmable chargers.**
- **Works with TC (Elcon) type chargers.**
- **Interfaces with the CMon, SiMon, and UMon.**
- **Programmable charger voltage and current.**
- **High and low (balance) power levels.**
- **Can be used as a stand-alone CAN charger controller.**
- **Fuel door (and dashboard) charge status LED.**
- **LED indicating charging, balancing, charged, and fault.**
- **Uses common "USB" type interface cables.**
- **Interfaces to SiLed for all wiring applications.**
- **Sealed in robust and safe plastic.**
- **Red LED and green LED for PCB diagnostics.**
- **Compact in-line cable design to fit anywhere.**
- **Low power (4mA at 12V).**
- **Daisy chain option for multiple charger networks.**



SiCan (Simple CAN charger interface) provides a low cost stand-alone programmable charger driver as an enhancement to a BlockMon/LongMon Battery Angel™ network provided by Batrium.

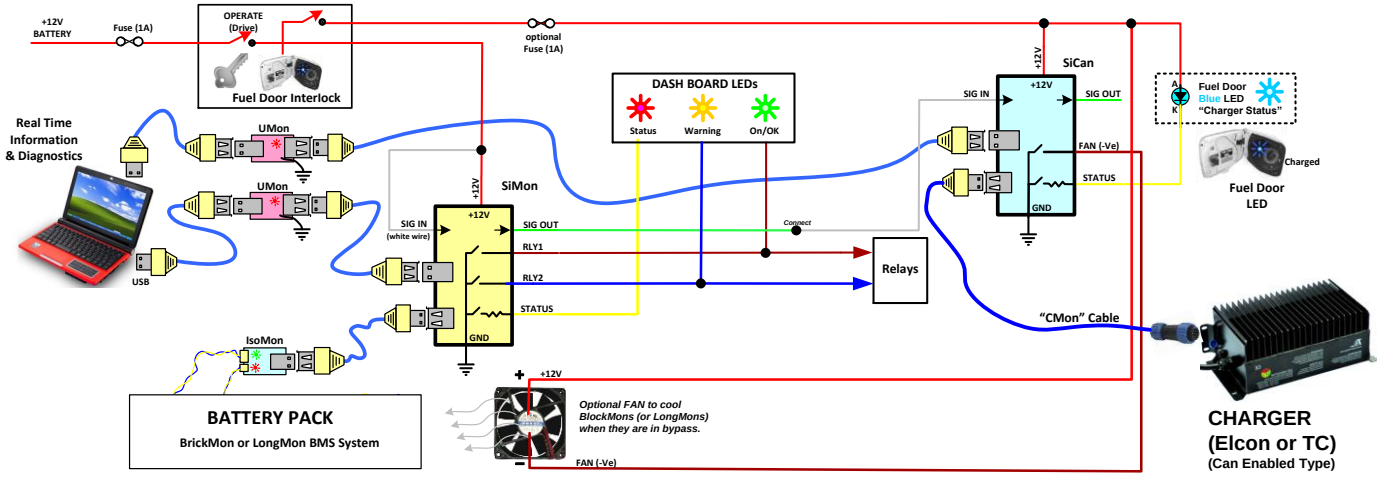
This is an in-line device that when connected to a SiMon, it provides a complete programmable charger solution (including most of the features in the Batrium Software). When connected to the CMon cable it provides a uniquely simple fully programmable driver for CAN-enabled (TC or Elcon) chargers. It has fully programmable parameters for the full range of battery pack voltages and charging currents. With simple "fuel" door (or dashboard) LED interface, the operator is always confident of the battery charger's state.

It holds programmable parameters that determine charger currents, voltages, alarm thresholds, and time-outs. As soon as 12V is applied, SiCan will constantly interrogate the battery charger, and respond with the optimised charge algorithm determined through the SiMon (controller) connected to the battery.

When connected directly to a PC (or tablet) via a UMon, the full charging process can be monitored by EvSuite (Batrium software). Also when connected to a SiMon and CMon, it runs autonomously controlling the charger and the fuel door LED.

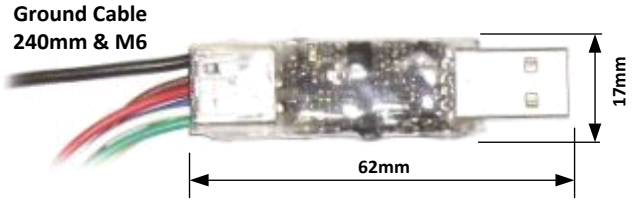
When connected to a SiLed (Simple LED interface) there is no external wiring/circuit required for most applications. SiLed also provides additional features.

It has a **red** and **green** LED for instant visual status and diagnostics. It even has an interface to other SiCans for expansion to multiple battery chargers.



Specifications – With a typical SiCan, CMon, SiMon and BlockMon/LongMon System.

Parameter	Min	Typical	Max	Unit	Notes
Charger Target and Actual Voltage Resolution		0.1		V	This is obtained from CAN-enabled charger.
12V Power Supply Range (operating as master)	5.5	12	20	V	This is the input voltage where SiMon will operate in master mode. Note: the FAN output switch to ground is limited to 14.8V although tolerant to 20V.
12V Power Supply Range (operating as slave)	3.4	5	5.5	V	The input voltage where SiMon will boot up in PC slave mode. Note: this mode is normally triggered by connecting the Tablet USB port through a UMon.
12V Supply Current		10	20	mA	Includes CMon power. Note: FAN and remote LED sink currents.
Fan Sink Current			2.0	A	SiCan sinks current to 0V (GND). It is not current limited.
Charger target and actual readings update rate.		1		sec	The charger commands are sent and received from the charger once every second. When the charger "actual" value is not received SiMon will switch to search mode and only transmit the "target" value once every 5 seconds.
Data rate		2400		Bits/s	To match the CAN Elcon (TC) Charger interface.
"USB" extension cable length	0		5	m	Male to female "USB" type cable length. See notes on USB extension cables in UMon datasheet.
Remote LED Internal Resistance.		1		kΩ	SiCan internal resistor switched to GND to limit the LED current. For 10mA LED at 12V. Use a LED without a built-in resistor.
Remote SIG IN High Threshold Level	1.0		2.7	V	Input voltages above this voltage will be detected as "High" (enable "full" charge rate). It is normally connected directly to SiMon "SIG OUT."
Remote SIG IN Voltage Range	-1.0		20	V	Allowable voltage range for this input pin before damage (10KΩ input impedance).
Remote SIG OUT Voltage Range (low and high)	0.0		3.3	V	For daisy chain to a second charger, 10KΩ output impedance.



SiCan Top View Dimensions Diagram

SiCan Side View Dimensions Diagram

Note: SiCan Version 2.0 hardware is easily identified by the label on the back of the PCB.

SiCan Interface Diagram

The block diagram of SiCan is shown on the right. Connect +12V (**red**) to the switched charge enable power. Connect GND (**black** eye terminal) to chassis.

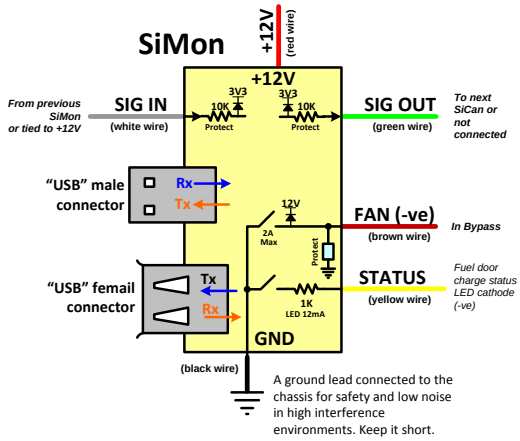
Connect SIG IN (white) to the previous SiMon SIG OUT (**green**). For the manual SiCan, connect the SIG IN (white) to +12V as an "enable input."

Connect an optional FAN (**brown**) output to the negative (return) ground lead of a fan.

Connect the Status LED (Yellow) output to the fuel door **BLUE LED** cathode.

Connect the "USB" male connector to a UMon (from a PC USB port). SiCan can also operate without this optional connection to the PC.

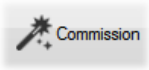
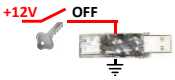
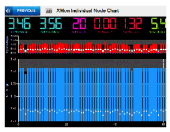
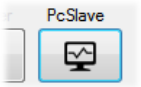
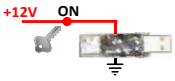
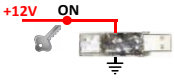
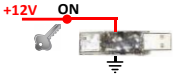
Connect the "USB" female to a CMon (i.e. Charger).



SiCan Interface Diagram

SiCan Operation (Master and Slave)

Both SiCan and the PC can operate in “Master” and “Slave” modes (in a similar manner as SiMon). The following table forms a summary these modes.

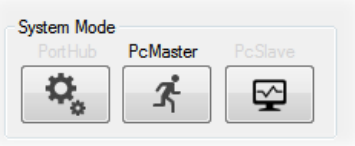
System Mode	PC Mode	SiCan +12V (Red wire)	PC USB (UMon)	SiCan State	State Description
Configuration & Setup 	PC Master (Setup)	0V (no power) 	Connected	Slave	PC can send SiCan programming/setup messages (PC control) The charger is disabled.
PC Monitoring 	PC Slave (Listening) 	+12V (battery) 	Connected	Master	SiCan is sending and receiving messages to/from the charger (SiCan in control). PC is monitoring charger set-point and actual voltages and currents.
SiCan Standalone (Charging)	No PC (Driving)	+12V (battery) 	Not connected	Master	SiCan is sending and receiving messages to/from the charger (SiCan in control). No PC monitoring.
Error with Two Masters (Error state)	PC Master **(Error)**	+12V (battery) 	Connected	Master **(Error)**	**Error state** (both PC and SiCan are masters). The data to the charger is corrupted. SiCan cannot respond with data.

When SiCan is running autonomously, it is referred to as “**SiCan Master**” mode. This is the normal “charging” mode where SiCan is in control. SiCan controls the charger, the Dashboard LEDs and the fan relay.

SiCan can also work in “**SiCan Slave**” mode where it can be programmed (configured). In this mode it is not in control of the charger. The PC is set to “**PC is Master**.”

SiCan is forced into master mode by applying +12V to the **red wire** and connecting the SiCan “SIG IN” to a SiMon “SIG OUT” (or +12V). It is forced into slave mode by disconnecting the +12V (power off) and connecting a UMon (USB port). In this mode the SiCan is powered from +5V via the PC. Normally the +12V (**red wire**) is switched “ON” and “OFF” through the charge enable fuel door interlock. However, a relay or diode may be required to allow SiMon to be powered while charging. Example logic (wiring) is provided in the application diagrams. These components are conveniently provided within SiLed (Simple LED Interface PCB).

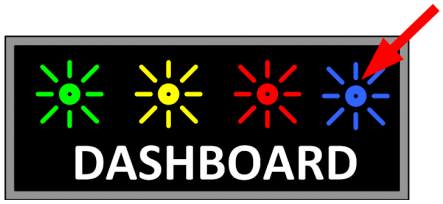
It is important to understand how the +12V (**red wire** on SiCan) affects the Master and Slave modes. It is essential to control this (fuel door interlock) to allow correct configuration and operation (see table above). The PC application can also be in “PC Master” or “PC Slave” mode. The term “Master” means it is transmitting data (either SiCan or PC). It is not logical to have both as Masters (SiCan and PC), and in this state the data to the charger bus will be corrupted (**error state**), and there will be no data available from either SiCan or the charger.



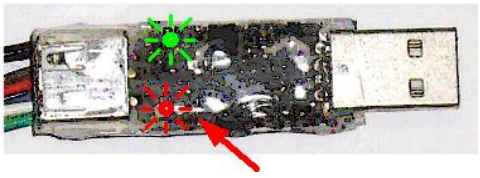
Fuel Door, Dashboard And SiCan Diagnostic LED Indicators

An optional fuel door charge-status (and optional dashboard) LED can be connected. These can be connected via the wiring/application diagrams provided in this document or through the use of SiLed (Simple LED Interface) PCB. There are also two diagnostic LEDs on the SiCan PCB.

SiCan Blue Fuel Door Charge LED



Dashboard Blue Charge State LED



SiCan PCB red LED

The **green, red, and yellow** dashboard LEDs are from SiMon, however they also indicate the charger states (see SiMon data sheets for more details). The **blue dashboard LED** and **blue fuel door LED** provides charger status.

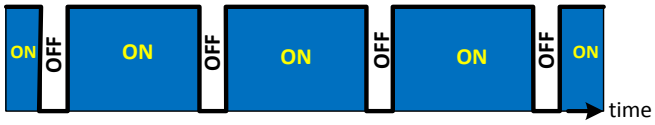
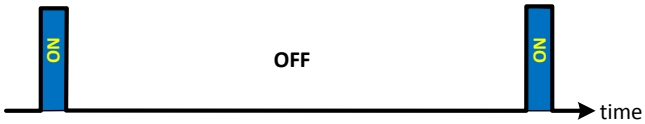
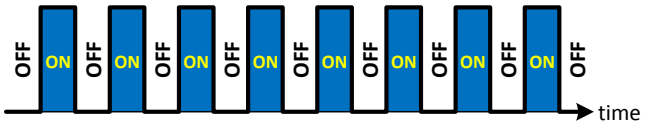
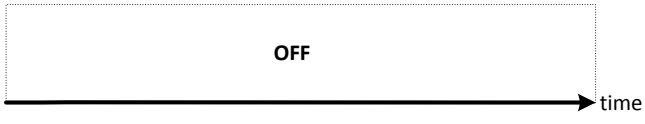
Also see the following sections describing the "SiCan LEDs and Fan Wiring."

LED	MEANING
Blue fuel door charger LED	Charger status. e.g. charging, balancing (equalising), complete and charger error. See the following tables for LED states. This LED is normally mounted near the fuel door. See table below.
Blue dashboard charger LED	Optional dashboard charger status. It is normally put in series with the fuel door charger LED so that it indicates the same information on the dashboard. See wiring details in the application diagrams.
Green dashboard "OK" LED **Yellow dashboard "Warning" LED** **Red dashboard "Status" LED**	These LEDs are actually connected to SiMon as dashboard status LEDs. See tabulated details of these in the SiMon datasheet.
Green SiCan PCB diagnostic LED	SiCan diagnostic LED. Indicates message status and "heartbeat". See table below.
Red SiCan PCB diagnostic LED	SiCan Status LED. Same as Blue fuel door status LED. Used for SiCan diagnostics and status. See table below.

Blue Fuel Door Charger Status LED.

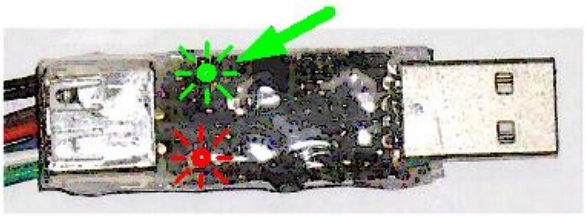
The **blue fuel door charge status LED** provides intelligent pulse sequences that allow a logical charger status indication to the operator. Basically higher average intensity of the LED indicates higher charge current. Thus at the start of charge (at maximum current) it is fully "on." As it throttles back for balancing it pulses off occasionally. At end of charge it is "off." It always has an occasional pulse to show heartbeat. When it flashes fast it is indicating an error has occurred and the charge process has stopped. The following table is helpful.

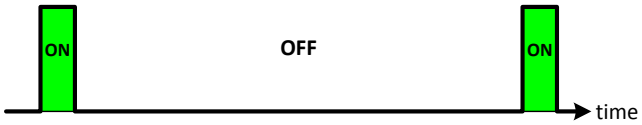
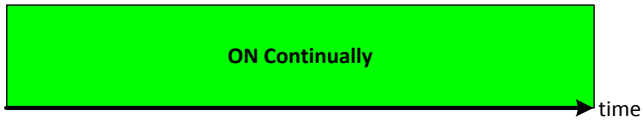
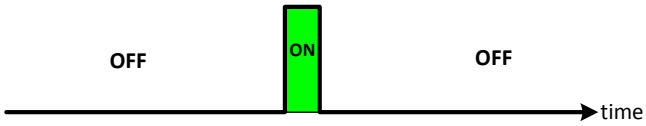
The SiCan PCB diagnostic **red LED** shows the same information as the **blue fuel door charge status LED.** It is a direct copy.

Blue Fuel Door Charge LED **(Same as dashboard LED as it is wired in series)** **Also same as the SiCan PCB diagnostic Red LED**	**Condition.**
Continually "ON" with an "OFF" pulse every 3 sec. 	**Full Charge (high current).**
Continually "ON" with an "OFF" pulse every 1 sec. 	**Slow Charge (balancing/equalising)**. Near end of charge.
Flash "ON" every 3 seconds. 	**Charge Complete**. This state is latched and is only reset after cycling the power.
Flashing Fast (0.1 sec rate) 	**Error occurred (not charging).** 1) Check that the charger is connected. 2) Restart charging (power cycle). 3) Parameter is out of range. 4) SiMon detected an error (critical). 5) See diagnostic section in this document.
OFF (no LED pulses) 	**Power is OFF (fuel interlock door open).**

Green SiCan PCB Diagnostic LED.

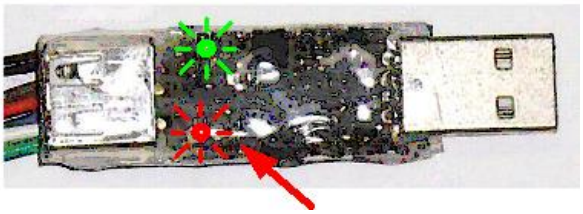
There is an additional **green diagnostic LED** on the SiCan PCB. This LED flashes for every valid message received from the PC. It also flashes whenever a charger status message is received from the charger (i.e. once every second). It will stay "**ON**" when SiCan has been set into the programming modes. When "ON", it will still provide the 100ms status flashes, except that it will flash "**OFF**" and not "**ON**".



GREEN DIAGNOSTIC LED (at the SiCan PCB)	**Condition.**
Flashing Slowly (once every second) 	**Normal state.** Flashes every time the charger "Actual" message has been successfully received. There is no error.
Continually "ON" 	**SiCan configuration/programming mode**. This allows programming of parameters.
Single flash 	**SiCan message received** and has been interpreted by SiCan.

Red SiCan PCB Diagnostic LED.

The **red diagnostic LED** on the SiCan PCB shows the same (identical) status as the **blue fuel door charge status LED** (see above). It is a direct copy.

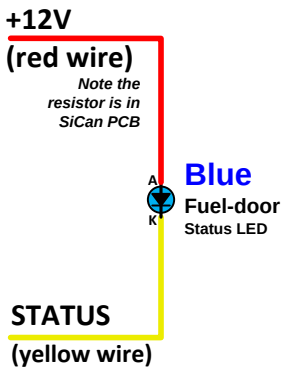


SiCan LEDs and Fan Wiring.

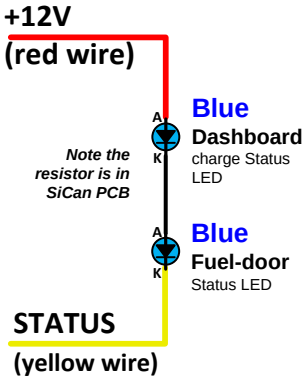
When SiCAN is connected to a SiLed PCB the wiring for the LEDs and optional BlockMon/LongMon cooling fan option is provided. For most EV/normal applications a cooling fan is not required as balancing usually takes a few minutes each charge cycle at the typical 1A bypass current level, however some difficult applications require the full 2A of bypass current capabilities for long periods, and thus the use of the optional cooling fan.

Alternatively the optional LEDs and optional cooling FAN are connected according to the following diagram.

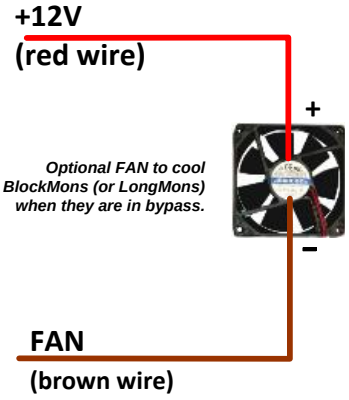
A 12V cooling FAN can be connected to the brown wire. It is turned "on" by SiCan when any BlockMon/LongMon are in bypass (generating heat). The fan is only need if very high bypass currents are required in a confined space.



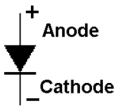
Blue Fuel Door Status LED

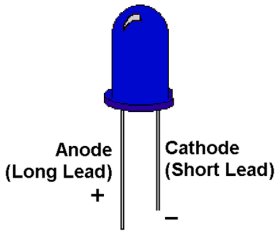


Two Blue LEDs (Dashboard And Fuel Door)



FAN Connection (optional)





SiCan STATUS LED wire already includes a current limiting (series) LED resistor on the PCB. Do not use "12V" type LED bezels, as they already contain internal resistors. If you have already purchased "12V" type LEDs, they can be opened and the resistor removed. The LED can also be replaced with high brightness type devices.

SiCan Connections

SiCan "USB-type" connections are opposite gender (male and female) for direct inline connection in a Battery Angel™ network. SiCan is connected between a UMon and a CMon. Up to 5 meters of common USB male-to-female extension cable can be added at either end. The recommended "USB" type extension cables used for SiCan are detailed in the UMon Data Sheet.

The SiCan "USB-type" connections are not actually USB, they use Battery Angel™ proprietary signals over common USB cables. Use a UMon inline to connect SiCan to a PC. Accidently connecting SiCan or CMon directly to a PC USB port will not harm the PC or SiCan, however it will not work without a UMon.

SiCan interfaces to the Car 12V system (Interlock, FAN, LEDs etc.) as well as SiMon and other SiCan units.
The following table details the signal wires to/from SiCan. See SiCan block diagram and description above.

COLOUR	SIGNAL	FUNCTION/TYPE	WHEN HIGH	WHEN LOW
Red	+12V In	**+12V power supply for SiCan** Enables SiCan function (SiCan Master). When it is only powered from USB (+5V) then SiCan is in slave mode (PC Master).	SiCan Power (9V-20V)	SiCan Off (0V)
Black	GND	**0V (chassis) connection to SiCan** Low impedance connection to chassis (for low noise).	n/a	n/a
White	SIG IN	**Input to enable SiCan** Normally connected to SiMon "SIG OUT" to control SiCan operation. It can also be manually enabled at full charge current by connecting this to +12V. Leave open or connect to GND to disable.	Enable (3V-20V)	Disable (0V)

COLOUR	SIGNAL	FUNCTION/TYPE	WHEN HIGH	WHEN LOW
		Note: This signal is also used to receive data from a previous SiMon when there are multiple battery networks (battery packs).		
Green	SIG OUT	**Output to next SiCan "SIG IN"** This is used to send data to the next SiCan (multiple chargers). Leave this disconnected when there is no additional SiCans in the chain.	Enable (3.3V)	Disable (0V)
Brown	FAN Out	**Low when bypassing (near-end-of-charge)** This turns on the fan to cool the BlockMons/LongMons while in bypass. Connect this to the negative wire of the +12V fan. 2A open drain (with transient protection)	Not in bypass (Open Circuit)	At least one cell in bypass (Switched to GND)
Yellow	STATUS LED Out	**Status (Blue LED) Cathode (sink)** The **blue LED** for fuel door and dashboard charger status. The cathode (-ve) is connected to this signal. Anode (+ve) is connected to +12V. This LED shows status of charger (see LED states table). It is open drain (switched to GND) through an internal 1KΩ series resistor in SiCan.	LED off (Open Circuit)	LED "ON" or "Flashing" (Switched to GND)

Mounting and GND Connection.

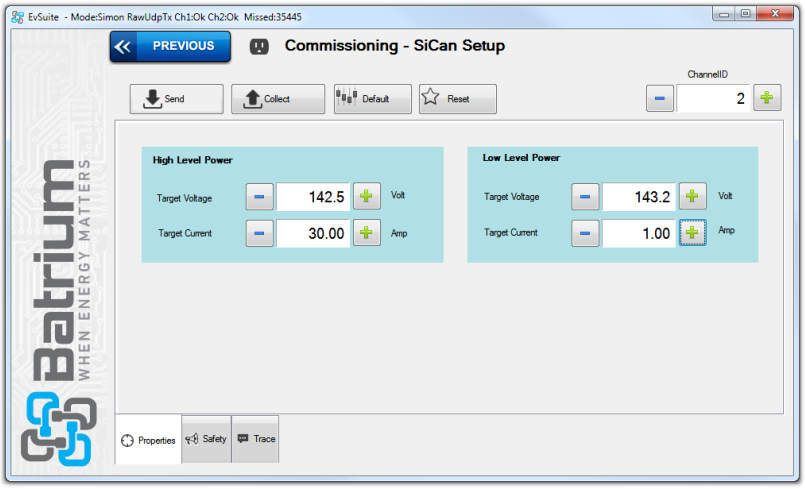
SiCan is encapsulated (sealed) in a tough transparent coating (outer sheath). It forms part of the '"USB" connector. This is normally sufficient for most EV applications. An outer sheath of clear heat-shrink can be added over the connector and the devices for more robust requirements.

SiCan is normally connected directly to SiLed (Simple LED Interface PCB), where the SiCan can be placed inside the SiLed enclosure or outside the SiLed enclosure (exposing the PCB LEDs). The ground connection is made through the GND pin on SiLED. It should be secured directly to the chassis is ground. When not using the SiLed PCB. The SiCan wiring includes a chassis ground "eye" terminal that should be secured to a 0V reference M6 bolt.

This ground provides both single fault protection and added electrical noise (transient) isolation. Do not extend this black ground cable unless absolutely necessary. It is important that any extension cable be able to withstand fault currents (thick). Also be aware that extending this cable will reduce the electrical noise immunity of your system.

Programmable Features

The following variables are programmable and are permanently stored in SiCan memory. These are accessed from the **Commissioning – SiCan Setup** screen**.**



More details about these parameters are provided in the EvSuite ServiceCentre documentation. The diagram to the right is a reminder. The values available in the blue parameter section are tabulated below.

In order to set the SiCan parameters, SiCan must be in slave mode by turning off the +12V and connecting to a USB port through the UMon. It is always a good idea to check that the parameters have been stored by reading them after "Send" (with "Collect").

Use the "**Collect**", "**Default**" and "**Send**" buttons. The "**Channel ID**" must be said to the same as the "Find Port" value.

Variable	Min	Typ	Max	Unit	Description	Notes
Properties: High Level Power					This sets the maximum charger current and voltage (high level).	These parameters will be sent to the charger when the cells are **not** in bypass. The **blue LED** will be "on" with a slow flash "off" every 3 sec.
Target Voltage	0	Number of Cells x 3.75V	1000	V	Target voltage sent to the charger in "high power level."	It is typically set to 0.1V above the bypass cell voltage parameter (multiplied by the number of cells). e.g. set to 183.5V*(=3.75Vx50)* for a programmed bypass at 3.65V with 50 cells. This is limited by the particular charger chosen.
Target Current	0	Max charger current	1000	V	Target current sent to the charger in "high power level."	It is typically set to the maximum charger current. This is limited by the particular charger chosen. It can be lowered for more gentle charging, however it must be greater than the "Warning-Initial Bypass" current set in SiMon parameters.
Properties: Low Level Power					This sets the bypass (throttled) charger current and voltage (low level).	These parameters will be sent to the charger when the cells **are in** bypass. The **blue LED** will be "on" with slow flash "off" every 1 sec.
Target Voltage	0	Number of Cells x 3.75V	1000	V	Target voltage sent to the charger in "low power level."	It is typically set to 0.1V above the bypass cell voltage parameter (multiplied by the number of cells). See the example calculation above. This is limited by the particular charger chosen.
Target Current	0	Max charger current	1000	V	Target current sent to the charger in "low power level."	It is typically set to less than half of the maximum cell bypass current (e.g. 0.7A). This is limited by the maximum heat that can be dissipated in the BlockMons/LongMons. It can be lowered for more gentle charging, however it must be greater than the "Warning-Final Bypass" current set in SiMon parameters.
Safety - Overdue					This sets the points/time where the "critical" state will be triggered.	Triggering these conditions will stop charging. The **blue LED** will flash fast (alarm) "on" and "off" at 0.1 seconds. Critical condition can only be reset by cycling the +12V power supply (fuel door interlock).
Exceeds Interval	n/a	1,000	n/a	ms	If the critical alarm continues for longer than this time, it will latch permanently and stop charging.	It is important not to allow fault conditions to persist for too long. This parameter is preset to a value. It is not normally varied by the operator.
Missed Messages	n/a	5	n/a	#	If more than this quantity of missed charger messages occurs in a row the critical alarm will be latched after the "Exceeds Interval" delyand prevent charging.	It is important that a broken or intermittent charger signal does not persist for too long. Each charger message arrives every second thus the value of 5 represents 5 seconds of missing charger data before the critical interval starts. See diagnostic section. This parameter is preset to a value. It is not normally varied by the operator.
Safety – Shutdown					This sets the points/time where the "critical" state will be triggered.	Triggering these conditions will stop charging. It also sets the end of charge condition (stop current). The **blue LED** will indicate the critical or end of charge state.
Low Supply Volts	5.5	9.0	20.0	V	If the 12V car battery goes **below** this voltage, SiCan will begin the critical timer.	It is important not to run the charger with a low 12V battery. Critical errors can only be reset by cycling the +12V power supply (fuel door interlock). When critical is latched the **blue LED** will flash fast (alarm) "on" and "off" at 0.1 seconds.
Stop Current	n/a	0.8	n/a	A	If the charger current goes below this value, end of charge condition will be latched. It is only available on some FW versions.	Note: normally the end of charge condition is determined by SiMon through the "Warning - Final Bypass" parameter. This parameter is prese and it is not normally adjusted.

Commissioning/Diagnostic Sequence

The normal commissioning sequence for SiCan is detailed in the system user manual, however a summary is provided here. It is usually best to recommission SiCan when the configurations state is unknown. The typical sequence is as follows:

1) First check for correct SiMon operation with the battery network with no critical alarms (**no** fast flashing red LEDs on the dashboard or SiMon).
2) Set up the SiCan parameters by connecting SiCan, UMon, (no charger/CMon is required) and establish the correct operating parameters using the EvSuite commissioning SiCan menu (with +12V **not** applied).
3) Supply power to the charger and connect SiCan to the charger via the CMon cable.
4) Ensure that the SiCan "SIG IN" (white wire) is connected to SiMon "SIG OUT" (green wire).
5) Ensure that the battery network is complete (blue and yellow twisted wires).
6) Apply +12V to the SiMon (with "SIG IN" at +12V), SiCan (with "SIG IN" connected to SiMon "SIG OUT") and with the EvSuite in PC slave mode, observe the **Telemetry SiMon/SiCan** status screen.

Diagnostic Options

Batrium has taken great care to simplify the system however, in any system there are sometimes adverse events that require diagnostic procedures. Fortunately SiCan has a convenient **red LED** and **green LED** on the PCB for diagnostics and status indication. See more details in the section on "SiCan diagnostic LED Indicators".

The EvSuite documentation provides a commissioning sequence. Often all that is required is to follow this sequence.

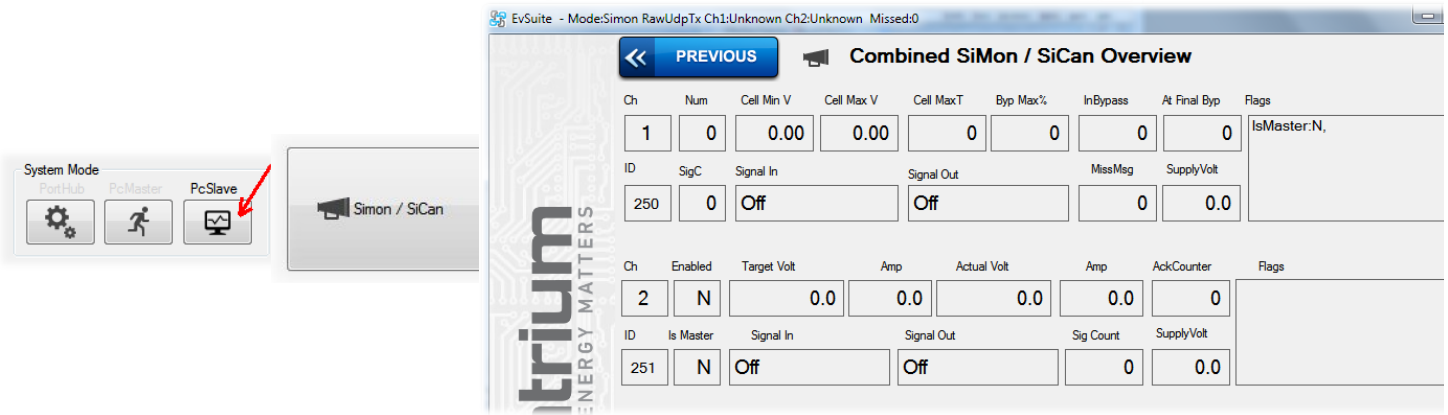
The most common problems are:

1. SiCan does not have +12V connected (it is not master). It only transmits to the charger when +12V is connected.
2. The white "**SIG IN**" wire on SiCan is not connected (normally connected to SiMon "**SIG OUT**") to provide communications from SiMon.
3. SiCan and PC master modes are in conflict (both transmitting at the same time). Only one can be master. With two masters data will not be transmitted to the charger.
4. SiCan has been programmed with incorrect parameters. Parameters can only be programmed when +12V is off.
5. Incorrect channel (Channel **ID**) is used for the SiCan USB network in EvSuite.
6. SiMon or the battery network (twisted yellow and blue pair cables) is not operating correctly. Use the SiMon diagnostic options before attempting to get SiCan working.
7. SiMon should not have a critical alarm condition (red flashing LED).
8. One of the batteries in the network is below the BlockMon/LongMon operating voltage range (battery depleted).
9. UMon (and USB cables) are not connected or configured correctly in the EvSuite software.
10. The EvSuite software "**host"** is not available (not running).

When power is first applied to SiCan (+12V or USB), both the **red LED** and **green LED** will pulse "on" to indicate power has been applied (reset). Note that SiCan can be powered from +12V or USB power (through UMon), it will reset whenever +12V is applied.

The **red LED** (and **Blue LED**) always indicates the charger status. The **green diagnostic LED** on SiCan indicates both message status and heartbeat. These are detailed in the table in the previous chapters. It is recommended to study the **red LED** and **green diagnostic LED** pulse patterns to determine SiCan critical, alarm states and the data states.

More detailed diagnostic information is available once SiCan is connected to a PC (or tablet). SiCan status is observed by putting the EvSuite software into "PC slave" mode and selecting "Telemetry" then the "SiMon/SiCan" menu. This will only be populated if SiCan has +12V applied. See section describing "**SiCan Operation (Master and Slave)**".


System Mode
PortHub
PcMaster
PcSlave
Simon / SiCan
EvSuite - Mode:Simon RawUdpTx Ch1:Unknown Ch2:Unknown Missed:0
PREVIOUS
Combined SiMon / SiCan Overview
Ch Num Cell Min V Cell Max V Cell MaxT Byp Max% InBypass At Final Byp Flags
1 0 0.00 0.00 0 0 0 0 IsMaster:N,
ID SigC Signal In Signal Out MissMsg SupplyVolt
250 0 Off Off 0 0.0
Ch Enabled Target Volt Amp Actual Volt Amp AckCounter Flags
2 N 0.0 0.0 0.0 0.0 0
ID Is Master Signal In Signal Out Sig Count SupplyVolt
251 N Off Off 0 0.0

Channel 2 should populate with the SiCan status. It is normally updated once every second. However if it only updates once every five seconds then the charger communications is not working and SiCan is busy looking for the charger messages and not updating the screen. It will only update the screen if it receives a charger message (approximately once a second). It will occasionally update the screen with fault conditions approximately once every five seconds (when there is no charger).

If the screen is blank (no data) then check the following:

1. Does SiCan have +12V applied?
2. Is the white "**SIG IN**" wire on SiCan connected to SiMon "**SIG OUT**" to enable communications to SiCan?
3. Is EvSuite in "PcSlave" mode?
4. Is the UMon connected with the USB cable?
5. Is the charger turned on?
6. Is the CMon cable connected?
7. Is there a **green LED** flash **once every second** on SiCan indicating that the charger communication message has been processed? It must flash once a second. If it flashes once every five seconds then the charger is not communicating.
8. Is the USB port working (see top window bar indicating "CHx"OK").

The screen will normally populate (at least occasionally) as long as SiCan is master and PC is slave.

Once the screen is populated with data (i.e. SiCan is transmitting status), the cause of "Warning" and "Critical" events can be observed in the box on the right hand side labelled "Flags". Normally it will indicate "**IsMaster:Y**" (i.e. SiCan is master). It will also indicate other states that cause "Warning" and "Critical" events. The warning condition is removed automatically once the warning stops. The critical condition is latched and will remain until the +12V power is cycled. The other fields on this page are also useful in diagnosing incorrectly programmed SiCan parameters. Further data about the "Combined SiMon/SiCan Overview" screen can be found in the EvSuite documentation.

While configuring the parameters it is important for SiCan to be in slave mode (+12V not applied). It is **not** necessary to have the charger connected via CMon. The parameters can be configured using the EvSuite commissioning "SiCan setup" screen.

Some common faults in the SiCan setup process include:

1. SiCan is still master (+12V applied).
2. The wrong “Channel ID” is selected on the commissioning screen (top right hand corner).
3. UMon and USB cables are not connected.
4. UMon is not configured correctly in EvSuite.
5. Bad data on the CMon cable (faulty cable) - this can corrupt the PC data.
6. The PC is not in “PC Master” mode.
7. The EvSuite software “**host”** is not available (not running). Also, there cannot be two EvSuite software “**hosts” anywhere on the (Home)** network. Only one host is allowed per network intranet.

The most basic diagnostic method has a UMon and SiCan connected only. This eliminates the rest of the system (+12V is not applied). Additionally, connecting the CMon and applying +12V will show the correct **green LED** status (flashing once a second).

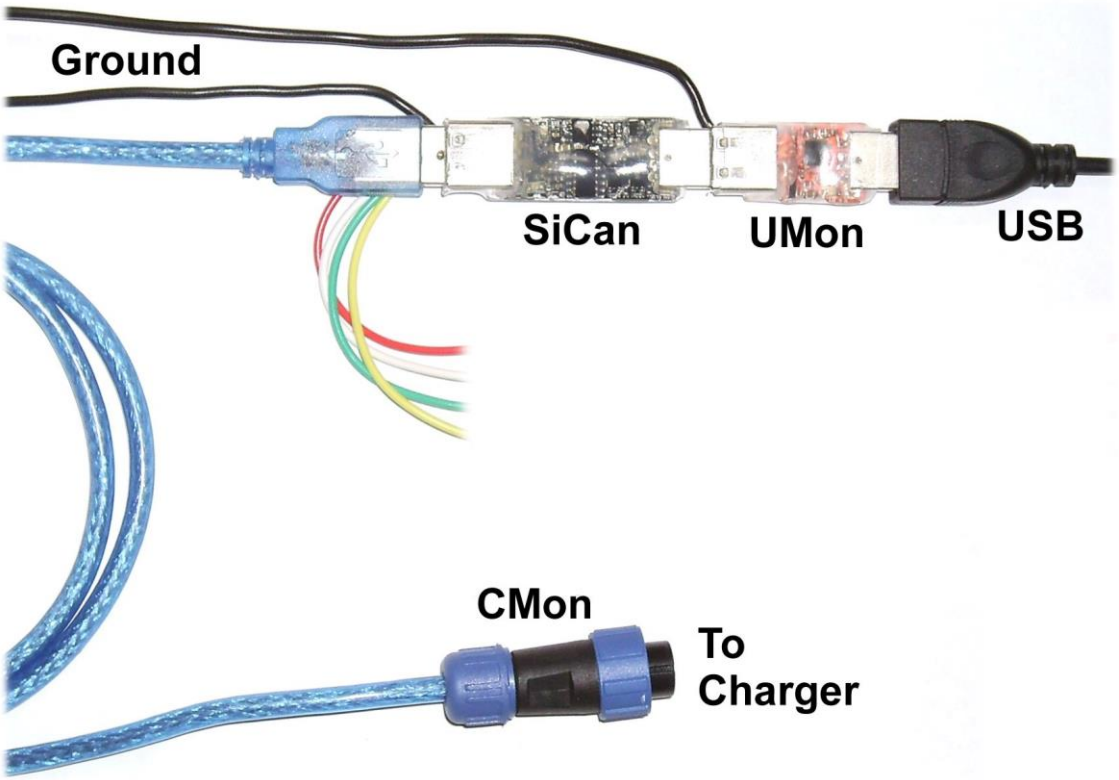
While installing and initialising the USB device (UMon), it may be necessary to disconnect and reconnect the USB cable to force a power reset. The USB commissioning and diagnostic sequence will instruct when to do so.

Application Diagram

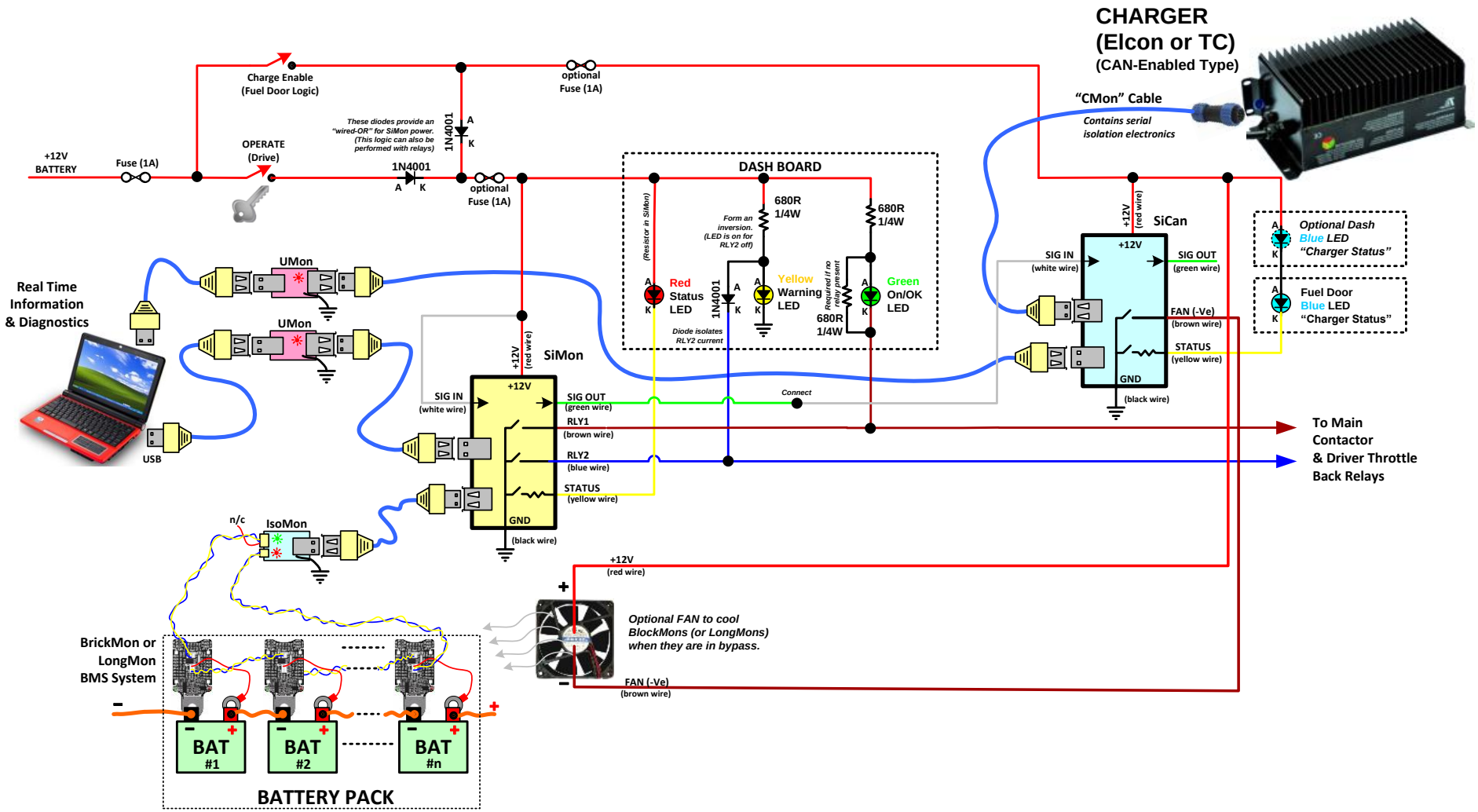
The following application diagram (next page) is a typical installation of SiMon and SiCan with a BlockMon/LongMon battery network.

SiCan can also be connected directly to SiLed (Simple LED Interface). SiLed provides all the external wiring and circuit.

Other detailed application diagrams are available in the SiMon data sheet.



Example Application Diagram - SiMon Supervision And CAN-Enabled (Programmable) Charger.



SiMon supervises the battery pack and provides the dashboard with warnings and critical states. SiMon RLY1 drives the main contactor. The programmable (CAN-enabled) charger is throttled back at near-full-charge and disabled at end-of-charge. There is an optional cooling fan that is turned "on" while in bypass. The system can optionally be monitored via UMons and the EvSuite software. The "Charge Enable Logic" is required to determine the correct time to begin charging.

The optional blue LEDs (fuel door and dashboard), provide charger state. More details are provided in the SiCan datasheet.